in Mangalore, a station on the west coast almost in the same latitude as Madras, was particularly heavy.

If something like what I have attempted to do in this paper be tried for the whole of the east coast we may get interesting results.

If really the sun has something to do with our monsoons, we may perhaps be better able to predict about their strength, now that a solar physics observatory has recently been established in our midst at Kodaikanal.

A DARK DAY IN WASHINGTON.

By Rev. M. ELLIS, Voluntary Observer, Mason County, Wash., dated October 15, 1902.

Friday, September 12, 1902, was the darkest day that the oldest inhabitant of Hood Canal, in western Washington, ever knew here, owing largely to the smoke from heavy fires in western Washington and western Oregon. At Twana, in Mason County, it appeared as follows: The evening before was somewhat smoky, though not peculiarly so, with a few ashes occasionally falling. About 3 o'clock on the morning of the 12th the whole heavens were a very bright red, according to the statement of a young lady who waked up, as she supposed, about that time, the light being similar in appearance to a certain kind of northern lights only it covered the whole heavens. By 5:30 a. m., when the writer first looked out, it had faded to a dull red. By 7 a. m. the reddish appearance had disappeared, it having turned to a gray color. At 9 a. m. it was possible to read in the house only by getting near a window, and even then it was quite trying to the eyes. By 11:30 a. m. the dull reddish color appeared all around, soon growing very bright in the north, but by 12:30 p. m. the brightest red was in the south. Between 12 noon and 1 p. m. was the darkest part of the day, it being utterly impossible to read out of doors. After 1 p. m. it began to lighten a little, the chickens, which had gone to roost, began to crow; 1:15 p. m. it was again possible to read out doors; at 2 p. m. there was considerable dull red in the sky, but it then disappeared to be seen no more, the heavens becoming again of grayish color. After 3 p. m. was the brightest part of the day.

There were four noticeable peculiarities about the smoke. One was the reddish color above mentioned, another the fact that the smoke did not seem to make the eyes smart, a third that the smoke did not have even the bluish color that dense smoke generally has, and the fourth that any light seen at a distance of twenty or more yards, whether coming from a lamp or a brush fire, was exceedingly white, in fact, very similar to an electric light, and the blaze from a brush fire rose up very slim and tall.

Mr. W. A. Hunter and wife started for their home on the upper Skokomish, 6 miles west of Twana, from the Canal Logging Company's camp, a mile distant, about noon. The road led through the heavy timber but they found it so dark that although Mr. Hunter tried to get along, he found it impossible to drive a team over the road without a lantern, so one was borrowed, which Mrs. Hunter carried, walking ahead, while Mr. Hunter drove the team behind. It was as dark in that timber, Mr. Hunter said, at noon as the darkest night he had ever seen.

The next day the atmosphere returned to its normal condition, and while it was very smoky, so as to make a person's eyes smart considerably, yet it was light enough to read anywhere in the house. The sun was not visible on the 12th.

The darkness seems to have traveled like a wave northward. At Astoria, Oreg., about seventy-five miles to the south, the darkness began on the 11th, so that it was necessary to have lights at 3 p. m. The sky was of a yellowish green and fog from the ocean was said to have mixed with the smoke. At Olympia, 30 miles southeast of Twana, on the 12th, it was darkest about 10 a. m. At Shelton, 10 miles south of Twana, there was considerable yellow mingled with the reddish appearance. Ten miles west of Twana, in the Olympian Mountains, the red appearance continued all day, though toward evening it was somewhat greenish; the brush fires not only had a tall, slim blaze, but were of a greenish color, as if some kind of a gas were burning. At Brinnon, 30 miles north of Twana, the sun was barely visible as a red ball in the morning, and it was not necessary to use lights in the houses until about 3 p. m., while at Twana they were used all day in most houses.

On the eastern part of Puget Sound, at Tacoma and Seattle, the darkness was very marked, but not so much so as on the western side at the base of the Olympian Mountains.

What caused the reddish appearance has not been satisfactorily explained. Some attributed it to the light from the fires, but this does not seem possible. The writer attributed it to the sun's rays working through the darkness, until he learned that the brightest red was seen about 3 a. m. There certainly seems to have been a very peculiar state of the atmosphere that day, which can only be explained by wiser meteorologists than the writer, but the day will be remembered as one in a lifetime.

INDIAN SUMMER.

A letter from W. M. Wilson, Section Director, Milwaukee, Wis., says:

Referring to your favor of recent date in regard to Indian Summer, I beg to enclose herewith the result of the examination of our records by Mr. J. W. Schaeffer, Observer, Weather Bureau.

After going through the records, Mr. Schaeffer is of the opinion that the conditions which are popularly regarded as belonging to Indian Summer obtain quite as frequently in other seasons as during the autumn months.

If you can suggest some better method of tabulating the data or desire a more complete statement I will be glad to have it done.

These periods relate to the seasons ordinarily designated in meteorologies as the mild, dry period, characterized by a hazy and smoky condition of the atmosphere, and occurring at the ending of October and the beginning of November.

The records at this office show that these periods do not occur with any regularity in the successive seasons, and in some years do not occur at all.

1872, Indian Summer set in apparently on September 30, with a hazy and smoky condition; lowest preceding temperature, 40°, on September 27; continued till October 28; cirrus clouds prevailing; rain, 0.56 inches; winds, from calm to 32 miles, generally, however, light from calm to 12 miles; variable, but mainly northwest; highest barometer, 30.49, on 24th; lowest, 29.44, on October 15; mean temperature, 46.7°; maximum, 75°, on 20th; minimum, 29°, on 11th; killing frost October 10; temperature, 32°; rain, 0.22 on 22d, 0.21 on 6th, and 0.13 on 22d of November. September, mean temperature, 62°; rainfall, 8.72. October, mean temperature, 47°; rainfall, 0.73. November, mean temperature, 30°; rainfall, 1.99.

1873, from October 7 to 25 hazy and smoky condition; lowest preceding temperature, 36°, on 6th; cirrus and upper cumulus clouds prevailing; rain, 0.06 on 16th, 0.72 on 17th, 0.01 on 21st, and 0.01 on 22d; winds, from calm to 10 miles, mainly southerly and southwest; highest barometer, 30.48, on 25th; lowest, 29.53, on 21st; minimum temperature, 26°, on 23d; maximum, 75°, on 15th; mean, 49°; evidently killing frost occurred on the 22d. Mean temperature for September, 60°; rainfall, 2.89; mean temperature for October, 46°; rainfall, 1.96; mean temperature for November, 30°; rainfall, 1.72.

1874, evidently beginning September 28 and ending October 25. Clear, hazy and smoky weather predominating, but stratus clouds frequently occurring; rain, 0.11 on 5th, 0.07 on 10th; winds, 2 to 26 miles, generally averaging 10 miles, mainly northwest to southwest, few easterly; maximum barometer, 30.56, on 13th; lowest barometer on 1st, 29.54; mean temperature for the period, 54.4°; maximum, 78°, on 20th; minimum, 28°, on 13th; killing frost on the 12th; mean temperature for September, 65°; rainfall, 4.51; mean temperature for October, 50°; rainfall, 1.90; mean temperature for November, 35°; rainfall, 2.69.

1875, from October 18 to 24, haze on all days; lowest preceding temperature, 29°, on September 27; killing frost; no clouds; no rain; winds southwest, from 5 to 20 miles; highest barometer, 30.16, on 18th; lowest on 23d, 29.68; mean temperature, 48.8°; maximum, 78°; minimum, 33°. Here are six days only that can be called Indian Summer, such periods are common to all months of the year. September, mean temperature, 57°; rainfall, 4.31. October, mean temperature, 44°; rainfall, 2.37. November, mean temperature, 31; rainfall, 1.16.

1876, from October 1 to 28, light haze and smoke occurred on six days